DOCUMENT RESUME

ED 375 883 JC 940 599

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TITLE The Biasing Effects of Nonresponses on Information Gathered by Mail Surveys. Institutional Research Report No. 78.
INSTITUTION Philadelphia Community Coll., PA. Office of Institutional Research.
PUB DATE Jun 94
NOTE 21p.
PUB TYPE Reports - Research/Technical (143)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Community Colleges; Error Patterns; Followup Studies; Graduate Surveys; *Mail Surveys; *Questionnaires; *Research Methodology; *Response Rates (Questionnaires); *Statistical Bias; Two Year Colleges
IDENTIFIERS Community College of Philadelphia PA

ABSTRACT

While mail surveys offer an efficient and cost effective means of gathering large amounts of student-related data in a relatively short time, surveys characterized by low response rates may have a biasing effect on information. To examine this bias, a study was undertaken of the characteristics associated with samples from three graduate follow-up surveys conducted at CCP between 1989 and 1991. Demographic characteristics, entering academic abilities, academic engagement, and persistence were examined for survey respondents, voluntary nonrespondents who received the survey and chose not to participate, and involuntary nonrespondents who did not receive the questionnaire due to an incorrect address. The most consistent group differences were associated with academic performance and persistence. Respondents earned higher grade point averages (GPA's) and persisted for a longer time than nonrespondents. Voluntary nonrespondents were less academically successful and persisted for longer periods than involuntary nonrespondents. Results indicate that survey results may be skewed since the more positive a student's academic experience, the more likely she/he is to respond. The following strategies are suggested to reduce the number of nonresponses: (1) send a short, professional introductory letter and a simple, logical questionnaire; (2) include a self-addressed stamped envelope; (3) personalize the letter; (4) send a second survey to nonrespondents; and (5) remind students of the importance of making address changes. Contains 19 references. (KP)

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The Biasing Effects of Nonresponses on Information Gathered by Mail Surveys

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Institutional Research
Report #78
June 1994

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Executive Summary

This study explored characteristics associated with respondents and nonrespondents to mail surveys in order to better understand the extent and nature of nonresponse bias associated with information gathered through this method. Three groups of former students were included in comparative analyses: 1) survey respondents, 2) voluntary nonrespondents, and 3) involuntary nonrespondents. The latter two groups were distinguished from each other based on receipt of the survey. The second group received the questionnaire and chose not to respond while for the third group nonresponse was the result of not receiving the questionnaire since CCP did not have a current mailing address for the former student.

Data were obtained from three follow-up surveys of former students who either graduated or left the College prior to graduating. Possible biasing factors in the study included measures of demographic characteristics, entering academic abilities, academic experiences, and persistence.

In general, respondents tended to be more dissimilar to the two nonrespondent groups than the nonrespondent groups were to each other. Across the three surveys the most consistent group differences were associated with academic performance and persistence. Respondents earned higher GPAs and persisted for a longer time at the College than nonrespondents. Voluntary nonrespondents were less academically successful and persisted for longer periods of

time than involuntary nonrespondents. To a lesser degree, group differences were also found based on age and ethnicity.

These results indicate that survey results, when characterized by low response rates, need to be used cautiously if generalized to students who do not participate in the survey. Survey results could be positively skewed since it appears that the more positive the students' academic experiences at the College, the more likely students are to respond.

Introduction

Mail surveys are frequently used by colleges and universities to gather information about the post-college experiences of their former students. While mail survey methods offer an efficient and cost effective means of gathering large amounts of student-related data in a relatively short period of time, there are disadvantages associated with these methods. Mail surveys can be characterized by low response rates which may have a biasing effect on information gathered in this manner. Unsuitably low response rates to mail questionnaires and the consequent self-selected nature of the sample on which these survey findings are based lead to skepticism regarding the representativeness of respondent information. Self-selection of respondents can make inferences drawn from the questionnaire data tenuous and minimize the perceived usefulness of the questionnaire data (Berdie & Anderson, 1974; Fawler, 1984; Hutchinson et al., 1987; Smith & Bers, 1987).

A typical strategy that is used to establish the amount of confidence that can be placed in the generalizability of information gathered through these methods is to compare the profiles of survey respondents with nonrespondents or late respondents to determine if the groups differ with regard to contrasted characteristics (Hutchinson et al., 1987; Carifio et al., 1991). If these comparative analyses result in

nonsignificant differences, survey results are generally treated as fair representations of nonresponding students. If, on the other hand, the two groups are determined to be significantly different with regard to contrasted characteristics, survey results are either disregarded or used cautiously after applying weighting procedures that attempt to compensate for the possible nonresponse bias in the sample (Astin & Panos, 1969; Astin, 1970; Grosset & Boris, 1982; Kathon, 1983; Hutchinson et al., 1987; Goodfellow et al. 1988).

Comparative research has demonstrated that questionnaire nonrespondents can be significantly different from respondents with regard to attitudes and demographic characteristics. Gershen and McCreary (1983) found that individuals who are trusting and socially conforming respond to surveys with greater frequency than those who are not. Other factors which have been associated with the tendency to respond to questionnaires are higher economic status, higher levels of education, age, gender, higher academic achievement, and positive attitudes toward academic life and academic preparation (Rosenthal and Roshnaw, 1975; Ferber, 1978; Barton et al., 1980; Hamitt and McDonald, 1982; Hutchinson et al., 1987; Goodfellow et al., 1988; Carifio et al., 1991).

While a statistical evaluation of comparability across respondent and nonrespondent groups provides a strategy for assessing the extent and nature of nonresponse bias from all

sources, little is currently known about potentially biasing effects associated with specific sources of nonresponse. Included among 14 factors enumerated by Brooks (1970) as potentially contributing to nonresponse is undeliverable questionnaires due to incorrect mailing addresses. While this has been a persistent problem in survey research, its impact as a potentially biasing factor has been relatively unexplored.

The circumstances surrounding the nonresponse behavior of reachable and unreachable nonrespondent groups appear to be sufficiently dissimilar to warrant the separation of the two groups in analyses. For one group, nonresponse behavior is voluntary since it is based on a conscious unwillingness on the part of the student to respond while for the other group nonresponse behavior is involuntary, the result of failure on the part of the College to make contact. This study was designed to determine if there were student characteristics that systematically distinguished among survey respondents, nonrespondents who choose not to respond, and nonrespondents who are unable to respond because the College fails to make contact with them due to inaccurate mailing addresses.

Nature of Bad Address Problem

Concern over the influence of nonresponse bias in survey data is germane given the large amount of institutional data gathered by mail surveys. The extent of the problem is exemplified by, although not limited to, the experiences of

the Office of Institutional Research which has systematically gathered information about the post-community college experiences of graduates and former students through mail surveys. While satisfactory response rates have generally been associated with graduate surveys, a persistent challenge has been encouraging responses from former nongraduates who may have a diminished sense of connection with the College given their short-term persistence or the length of time elapsed since their departure. Smith and Bers (1987) observe that temporal factors such as these often combine to exaggerate the nonresponse problem for community colleges.

Statistical comparisons of respondent and nonrespondent groups to institutional surveys have generally produced mixed results. At times, small insignificant group differences based on demographic characteristics and academic experiences have been found. Other surveys have been characterized by significant nonresponse bias given the underrepresentation of student groups defined by race and student academic ability (Grosset, 1990). These past attempts to assess the level of nonresponse bias in mail survey data have not separated involuntary nonrespondents from voluntary nonrespondents.

Method

Data for this study was based on three follow-up surveys of former students who graduated or left the College prior to graduating. The surveys, which were conducted between 1989

and 1991, shared a common data collection methodology. The questionnaires used for the three separate surveys were single sided documents printed on white paper. In each case, the mailing included a postage-paid envelope for the return of completed questionnaires. Questionnaire items provided structured response options or called for one-word responses. Cover letters and questionnaires were mailed once and no attempt was made to encourage greater response rates through successive follow-up mailings.

The replication of data collection methods was possible across the three surveys since they were undertaken for the same purpose. The College participated in a national effort to define community college transfer rates. Toward this end, three groups of former students were surveyed over a three-year period in order to learn about their transfer-related experiences. The cohort of interest in these surveys was defined as students who entered the College four years prior to the survey and earned a minimum of 12 credits at the time of the survey. The three entering cohorts included students who entered each fall between 1985 and 1987. The length of elapsed time since departure from the College varied within these targeted cohorts, ranging from one semester to 3 1/2 years.

Return and nonreturn rates for each of the surveys included in this study appear in Table 1 which is located in the Appendix. The bad address rate of return ranged from 7.2 to 17.2%. Because of the skewed nature of the distributions

across the three respondent/nonrespondent categories, a weighting procedure was applied prior to data analysis. Random samples of students were selected from the larger pools of students comprising the "Received-Returned Survey" and the "Received-Did Not Return Survey" so as to approximate the size of the samples associated with the bad address category. As a result, each group represented about one-third of the data to be analyzed.

Respondents, voluntary nonrespondents, and involuntary nonrespondents were compared in terms of demographic characteristics, entering academic abilities, academic engagement, and persistence. Demographic characteristics included measures of racial background (African American; Hispanic; Asian; White), gender, age at time of survey, and financial need (received financial aid; did not receive financial aid) in both the first and last semester of attendance. Entering academic ability was measured by scores on placement tests routinely administered to new students prior to their first semester of enrollment at the College. These tests included a reading (range from 1 to 45), writing (range from 1 to 18), computational math (range from 1 to 25), and an algebra (range from 1 to 15) test. A fifth indicator of academic ability was the number of remedial credits taken by the student while at the College.

Cumulative GPA was used as an indicator of the academic engagement of the student and curricular type ("Select"; General Studies; Other) was included as a more generalized

measure of student integration. It was assumed that students in "select" curricula were most integrated into the academic and student life of the College, students in General Studies were least integrated, and the integration experiences of students in "other" curricula would fall somewhere in between.

Measures of persistence included the number of enrolled semesters and the cumulative credits earned by the student at the College prior to departure. The 14 items that were used for group comparisons across the three surveys appear in Table 2 in the Appendix.

Results

The most consistent results across surveys were associated with persistence and academic engagement indicators. ANOVA tests indicated there were significant group differences based on GPA, credits earned, and number of enrolled semesters. In each of the three survey samples, respondents earned significantly higher GPAs than either of the nonrespondent groups, and voluntary nonrespondents typically earned lower GPAs than involuntary nonrespondents (See Table 3 in the Appendix). Cumulative credits earned prior to departure from the College were significantly higher for respondents than for nonrespondents, regardless of voluntary or involuntary status. The pattern of group differences between nonrespondent groups, while consistently significant, varied in nature across the three surveys. In two of the surveys, involuntary nonrespondents amassed fewer

credits than voluntary respondents, while in one survey the opposite was true. The same pattern of response was true for the number of enrolled semesters prior to departure.

Age and ethnicity were demographic characteristics for which significant group differences were indicated in two of the three surveys. Older students were more likely to respond in two of the surveys and younger students were more likely to be unreachable because of an incorrect mailing address or to not respond by choice. The two nonresponding groups did not differ significantly with regard to age.

White students were more likely to respond than students from the other racial categories (See Table 4 in the Appendix). African American and Hispanic students were more likely to choose not to respond while Asian and African American students were slightly over-represented in the nonrespondent group due to incorrect mailing addresses.

Financial aid status was a relatively unimportant factor in terms of group differences. In just one of the samples, former students who received financial aid in their first semester were more likely to be included among the involuntary nonrespondents than were students who did not receive aid. Non-aided students were more likely to return the survey than aid recipients.

With the exception of remedial credits, other indicators of ability upon entry to the College were unimportant in defining group differences. Only one significant difference was noted across the four placement tests and the three

samples. In this one case, respondents had significantly higher scores on the reading test than did either group of nonrespondents.

In two of the three survey samples, former students with fewer remedial credits were more likely to return questionnaires than were students who had enrolled in a larger number of remedial courses. The two nonrespondent groups did not differ significantly in terms of remedial credits.

Discussion

While the challenge is to eliminate or greatly reduce the number of nonresponses for any reason, the strategies for accomplishing better return rates will be different depending on the voluntary/involuntary nature of the nonresponse. Effective strategies to encourage response from students who receive the survey include the following: short professional-looking introductory letter and questionnaire with simple and clearly asked questions that are presented in a logical sequence; inclusion of a postage-paid self-addressed envelope for ease of survey return; personalization of survey by use of name rather than a generic term such as 'student' or 'alumnus'; and a second-wave follow-up survey mailed to nonrespondents to the initial questionnaire request.

In an effort to eliminate incorrect addresses, students need to be reminded of the importance of informing the College of address changes, even after they dep t. While the Office of Development and Alumni Relations provides a

mechanism for graduates and former nongraduating students who complete a sizeable number of credits (45+) to keep the College informed of address changes after they leave, there is not a centralized office to facilitate address changes for the large number of former students who are not targeted by the Alumni Relations office. Knowledge of changing addresses for these students is likely to be shared by a wider constituency. As department heads, faculty and staff throughout the institution become aware of address changes, they should notify the Registrar's Office who will follow through by either directly changing the information on the data base or sending the student a change of information form for permission to revise their mailing address. Accepting the responsibility of informing the Registrar's Office will enhance the quality of student information used for assessment and planning by improving response rates and including information from students who have systematically been eliminated from mail survey data. In doing so, there is a primary benefit of serving students better and the secondary benefit of saving valuable institutional resources.

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APPENDIX

Table 1

Rates of Return and Non-Return Associated With the Three Samples in Study

Sample	Cohort Size	Received-Returned Survey		Received-Did Not Return Survey		Did Not Return Survey Because of Bad Address	
	#	#	%	#	%	#	%
Fall 1985 Entrants	1936	910	47.0	759	39.2	267	13.8
Fall 1986 Entrants	1740	891	51.2	724	41.6	125	7.2
Fall 1987 Entrants	1547	690	44.6	591	38.2	266	17.2

Table 2

Summary Table of Survey Respondents and Nonrespondent Differences

Variable	Test	Fall 1985 Entrants		Fall 1986 Entrants		Fall 1987 Entrants	
		Value	df	Value	df	Value	df
Ethnicity	Chi Sq.	15.04*	6	15.71*	6	8.05	6
Gender	Chi Sq.	0.08	2	0.74	2	0.72	2
Age	F-test	3.20*	2,756	0.71	2,897	3.84*	2,795
Financial Aid-First Semester	Chi Sq.	13.65**	2	3.43	2	3.85	2
Financial Aid-Last Semester	F-test	1.56	2	2.55	2	2.10	2
Reading Ability	F-test	1.12	2,756	3.71*	2,897	1.37	2,795
Writing Ability	F-test	0.40	2,756	0.30	2,897	1.60	2,795
Math Computation Ability	F-test	1.08	2,756	0.99	2,897	0.20	2,795
Algebra Ability	F-test	0.11	2,756	1.16	2,897	0.70	2,795
Remedial Credits	F-test	0.50	2,756	3.08*	2,897	5.41**	2,795
Curricula Type	Chi Sq.	3.13	4	0.06	4	1.47	4
GPA	F-test	3.11*	2,756	18.53***	2,897	7.83***	2,795
Credits Earned	F-test	9.81***	2,756	22.55***	2,897	12.89***	2,795
# of Enrolled Semesters	F-test	5.69***	2,756	8.66***	2,897	16.52***	2,795

* p > .05
** p > .01
*** p > .001

Table 3

Scheffe Results
Significant Differences in Group Means Across
Respondent Groups and Samples

	Fall 1985			Fall 1986			Fall 1987		
Group ------>	1*	2**	3***	1	2	3	1	2	3
# of Enrolled Semesters	10.9	9.6	8.8	7.6	6.4	5.8	7.4	5.9	6.3
Earned Credits	44.4	37.2	30.2	41.6	33.7	31.3	52.3	32.3	37.3
GPA	3.1	2.6	2.9	2.9	2.5	2.7	3.2	2.6	2.8
Remedial Credits	NS	NS	NS	6.3	11.1	10.6	6.2	10.4	10.7
Age	33.2	30.2	29.4	31.6	28.7	28.1	NS	NS	NS
Reading Ability	NS	NS	NS	NS	NS	NS	32.0	29.1	28.9

NS = No Significant Group Differences

* Group 1 received and returned survey

** Group 2 received and did not return survey

*** Group 3 did not receive survey because of bad address

Table 4

Significant Percentage Differences
Across Respondent Groups and Samples

	Fall 1985			Fall 1986			Fall 1987		
Group -------->	1*	2**	3***	1	2	3	1	2	3
Ethnicity									
African Amer.	NS	NS	NS	24.0	41.4	34.6	19.2	43.4	37.3
Asian	NS	NS	NS	31.8	30.5	37.7	36.6	28.3	35.1
Hispanic	NS	NS	NS	18.9	51.1	31.0	14.3	53.4	32.3
White	NS	NS	NS	36.3	29.1	42.0	42.0	26.9	31.0
Financial Aid First Semester									
Received Aid	24.4	27.9	47.6	NS	NS	NS	NS	NS	NS
No Aid	38.6	37.8	23.7	NS	NS	NS	NS	NS	NS

NS = No Significant Group Differences

* Group 1 received and returned survey

** Group 2 received and did not return survey

*** Group 3 did not receive survey because of bad address